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The readiness of start-ups to adopt generative artificial intelligence: a mandatory path towards sustainable growth

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Abstract:

This research examines the preparedness of startups to leverage computer-generated artificial intelligence for their sustained development. As competition intensifies, numerous startups believe that generative AI can assist them in innovating and enhancing productivity. Nonetheless challenges arise in its implementation, such as regulations, technology, and company dynamics, necessitating thorough examination.

The aim of this research is to assess the organizational, technological, and management capabilities of startups, as well as to understand how the adoption of these technologies impacts their financial performance and longevity. Through an in-depth analysis of various case studies from across the globe, the research concluded that the readiness of startups is a conscious choice, particularly in light of recent advancements, and it aids in evaluating a startup's capabilities in planning, technology, and operations. The findings included recommendations highlighting the necessity of establishing robust regulations and a strategic plan for effectively and responsibly utilizing computer-generated artificial intelligence.

Keywords : Generative artificial intelligence, start-ups, organizational and digital readiness, sustainable growth.

JEL Classification Codes: O33, L26, M15, Q01 .

ملخص

يدرس هذا البحث مدى استعداد الشركات الناشئة للاستفادة من الذكاء الاصطناعي المؤلّد حاسوبيًا لتحقيق نموها المستدام. مع ازدياد حدة المنافسة، اعتقدت العديد من الشركات الناشئة أن الذكاء الاصطناعي التوليدي يمكن أن يساعدها على الابتكار ويعزز الإنتاجية. ومع ذلك، تزداد تحديات تطبيقه، مثل اللوائح والتقنيات وديناميكيات الشركات، مما استدعى دراسة متعمقة. هدف هذا البحث إلى تقييم القدرات التنظيمية والتكنولوجية والإدارة للشركات الناشئة ، بالإضافة إلى فهم كيفية تأثير تبي هذه التقنيات على أداء المؤسسات واستمرارها. من خلال تحليل معمق لدراسات حالة متنوعة من مختلف أنحاء العالم، خلص البحث إلى أن استعداد الشركات الناشئة هو خيار واعٍ، لا سيما في ضوء التطورات الحديثة، ويساعد تقييم قدرات الشركة الناشئة على التخطيط والتكنولوجيا والعمليات. تضمنت النتائج توصيات تلح بضرورة وضع لوائح قوية وخطة استراتيجية لاستخدام الذكاء الاصطناعي المؤلّد حاسويًا بفعالية ومسؤولية .

الكلمات المفتاحية: الذكاء الاصطناعي التوليدي، الشركات الناشئة، الجاهزة التنظيمية والرقمية، النمو المستدام

رموزالتصنيفJEL : O33، L26، M15، Q01

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1. Introduction:

Over the last few years, the world has seen really fast progress in computer intelligence, and a new type of these computer systems has shown up, called generative AI, which can make different kinds of things like writings, pictures, computer instructions, and songs in a way that seems almost human. This change is a huge chance for new companies, which are usually known for being able to change and come up with new ideas, because they can use this technology to quickly make their businesses better and offer more products or services

But, just using this technology automatically is not a sure thing, because it also brings some big problems with rules, how things work, and doing what is right. Even though some new companies are taking a chance by putting money into big computer language systems or tools for making content, weak systems, not enough tech knowledge, not having control, and trouble fitting this technology into their business plan could get in the way of the good things it could do. Even though they can change easily and come up with new things, these groups still have problems using these new technologies in the best way because they do not have much tech help, people, or ways to organize. How ready new companies are is really important for using new AI technologies well. Being ready here is not just about having the stuff or tech skills, but it also includes some important parts: how the company is set up (how it is managed and teams are organized), tech skills (data systems, a computer intelligence team), and control (safety measures, doing what is right, rules).

In Algeria, new companies have started to become one of the new things that help the country's money system, helped by government plans and programs at universities that help new businesses grow. But, how ready they are to use generative AI is still not great, especially because of problems with computer systems, skills, money, and how the company is set up.

This raises the following key question:

To what extent are startups ready to adopt generative AI as a necessity for growth and sustainability?

Sub-questions

- What is the theoretical concept and conceptual framework of organizational readiness in the context of generative AI?
- What factors determine the degree of readiness of startups (technological, human, cultural, and financial)?
- What is the actual level of adoption of generative AI within startups?
- What is the relationship between the level of organizational readiness and the extent of adoption of generative AI?
- How can a practical model be built to enhance the readiness of startups to adopt these technologies?

Study hypotheses

- There is a statistically significant relationship between intermediate digital infrastructure and an organization's readiness to adopt generative AI.

- The level of digital human competencies positively influences the adoption of generative AI technologies.
- An innovative organizational culture contributes to enhancing institutional readiness.
- Leadership and strategic support are critical factors in increasing the level of actual adoption.

Significance of the study

Generative AI is one of the latest trends in digital transformation, and linking it to start-ups is a very innovative idea that is in demand in the academic arena.

The importance of the study lies in building a conceptual framework for adoption readiness among startups, and then testing the relationships between readiness on the one hand, and growth and sustainability on the other. It also seeks to propose practical recommendations for the responsible and sustainable adoption of generative AI, which could result in a practical framework or model for assessing the readiness of startups, making it an important scientific contribution.

- The availability of specialized human talent has a positive impact on an organization's readiness to adopt generative AI.

An organizational culture that is open to innovation enhances an organization's readiness to adopt generative AI.

- Leadership and strategic support for the organization directly contribute to increasing the actual adoption of generative technologies.
- The intermediate digital infrastructure (the organization's overall digital transformation) plays an intermediary role between organizational readiness and the actual adoption of generative AI.

Study objectives

- Analyze the theoretical framework of the concept of organizational readiness in adopting modern technologies.
- Enrich the recent literature on generative artificial intelligence and organizational readiness in the Arab startup ecosystem.
- Provide a realistic diagnosis and practical model that can be used by Algerian startups and decision-makers in university incubators.
- Identify the key factors influencing the readiness of start-ups to adopt generative AI.
- Analyze the relationship between readiness dimensions (technology, human resources, leadership, organizational culture) and the level of generative AI adoption.
- Analyze the digital readiness of startups in Algeria.
- Assess the actual level of adoption of generative artificial intelligence within Algerian institutions.

Methodology:

- **Inductive analytical approach:** through analysis of relevant global and local literature and previous studies.
- **Descriptive and prospective approach**: to conclude on the role of generative artificial intelligence in sustainability and its contribution to improving the value offered to start-ups through innovative solutions. Its adoption enhances the flexibility of the business model and its ability to adapt to change.

Research limitations

- **Thematic boundaries:** Focus on generative artificial intelligence in the context of startups.
- **Spatial boundaries:** Startups in global environments.
- **Temporal boundaries:** Studies and reports published between 2020 and 2025, as this period witnessed the actual emergence of generative AI technologies.

2. Generative AI:

2.1. Definition of generative artificial intelligence :

Generative AI stands out as a key area in today's artificial intelligence field, using complex computer models that can make new content (like words, pictures, or sounds) from lots of learning data. This kind of artificial intelligence is now used for more than just typical automated tasks; it is now considered a groundbreaking tool that is changing how businesses work and making new companies more competitive.

Brown et al. describe it as “a large-scale linguistic model based on deep learning technology that enables machines to generate coherent text based on a given context, allowing them to perform tasks similar to humans in conversation and interactive text writing.”)Moussa(2024 ، McKinsey says that generative AI is a part of AI focused on making new things, like pictures, words, videos, combined data, or other media, by using examples that machines have learned. Generation means making something new either from what is already there or from nothing at all. When talking about artificial intelligence, generation means that an AI system can automatically make new content without needing people to help. This content could be words, pictures, sounds, videos, or other types, and it can respond to what people want or tell it to do. The aim of generation in artificial intelligence is to be as creative and inventive as people, or even better. It also tries to make it easier and quicker to create content in different areas and to give users an AI helper that understands and meets their needs. (l-Khalifa, 2023) Generative artificial intelligence is defined as: “a set of models and algorithms that enable computers to produce new outputs that are meaningful and valuable, based on their learning of structural and cognitive patterns in previous data” . (Placeholder1)

It involves computer programs that create outputs that seem like they came from people, like Chat GPT, DALL-E, or MidJourney, where artificial intelligence creates realistic products that come from these technologies. The phrase generative artificial intelligence means a type of artificial intelligence system that can make original content, like writing, images, and videos, when it is given specific instructions. (Al-Ghamdi, 2024)

2.2. Stages of generative artificial intelligence:

The development of generative artificial intelligence has gone through several stages, which we summarize below (l-Khalifa, 2023):

The first stage: The beginnings of generation (1960 to 1990):

At this stage, the first attempts to create artificial intelligence systems capable of generating new content appeared, especially in the field of natural language processing. Among the most prominent works at this stage were:

- Eliza, the first chatbot developed in 1966, which uses simple rules to generate responses similar to those of a psychotherapist.
- Sardalo, a program developed in 1970 that uses natural language to interact with a virtual world of geometric shapes.
- AARON, a program developed in 1981 that uses artificial neural networks to generate digital artwork.
- Ractor, a program developed in 1983 that uses grammar rules and vocabulary to generate random and incoherent prose.

The second stage: Generative Development (1990 to 2020)

During this time, the area of creative artificial intelligence greatly improved because of the arrival of computer-based neural networks like creative opposing networks and transformers. A few of the most important projects during this time are:

- Creative opposing networks (GANs) – computer programs made in 2014 that use creative opposing networks to produce fresh pictures by tricking a matching network;
- Transformers: a system created in 2017 that uses a focusing tool to make natural language processing work better. It was initially shown in the report "Attention Is All You Need" and soon became the top system for most text data uses.

Phase Three: The Generation Explosion from 2020 to the Present:

In this phase, generative artificial intelligence has become one of the most prominent areas of intelligence, speed, power, and availability, thanks to artificial intelligence, computers, and the increased accuracy and complexity of machine learning models. Some of the most famous examples of this are:

- E-DALL, a program launched in 2021 by OpenAI, which uses generative adversarial networks to generate images from their written descriptions.
- Diffusion Stable is a program launched in 2022 that uses generative adversarial networks to generate images from textual descriptions. It also uses diffusion models (modelDiffusion), which are a type of deep generative neural network.
- Chat GPT is a program launched in November 2022 by OpenAI. It uses an improved language model for conversation, capable of generating natural responses that rival human responses.

2.3. Advantages and disadvantages of generative artificial intelligence:

- Advantages of generative artificial intelligence: (Explore the differences between generative and discriminative AI)

- Creativity and innovation: Generative artificial intelligence stimulates creativity by producing new and unique data, encouraging innovation in fields such as art and design, and pushing the boundaries of traditional creative processes.
- Data augmentation: Generative models improve training datasets, which improves the performance of other AI models by increasing data diversity, which is critical for developing powerful and accurate AI systems.
- Processing unlabeled data: Generative AI is characterized by learning from unlabeled data, making it versatile for unsupervised learning tasks, which expands its scope of application in various fields.

- **Disadvantages of generative AI:** (Explore the differences between generative and discriminative AI)

- Computational cost: Generative models require enormous computational resources, making them resource-intensive. This high demand for processing power and memory can limit their usefulness, especially for organizations with limited computational infrastructure. As a result, deploying generative AI models often requires significant investments in hardware and advanced computational capabilities.
- Sensitivity to outliers: Generative models are sensitive to outliers, which can affect the quality of the generated data. Outliers can skew the distribution of the acquired data, resulting in the creation of new data samples that are unrealistic or biased. This sensitivity requires careful preprocessing and careful management of extreme values to ensure the reliability of the generated outputs.
- Complexity: Training generative models is complex and often requires advanced expertise and techniques. The complex nature of these models also requires a deep understanding of machine learning principles and extensive experience in tuning various hyperparameters. This complexity can be a significant barrier to entry, making it difficult for beginners or those with limited technical experience.

2.4. Technologies on which generative AI relies:

Generative AI relies on several basic technologies to generate new and customized content. Among these technologies are:

- Deep Learning: Deep learning (DL) is a subfield of machine learning that uses artificial neural networks to learn complex patterns from data. (ELolamae, 2023)
- Generative Neural Networks:
- Large Language Models
- Reinforcement Learning

2.5. Generative AI tools and their areas of application:

Generative AI tools vary depending on the tasks they perform and the areas in which they are applied. The following are some of the main types of generative AI tools: ((https://www.competence.lu/wp-content/uploads/2024/05/Introduction_GenAI_EoAI.pdf) pp. 20-21, 2024)

Text generation tools - Image and video generation tools - Music generation - Code generation tools; Audio content generation tools - 3D design generation tools - Data generation tools - Interactive text generation tools.

2.6. How generative artificial intelligence works:

The special tools that power creating artificial intelligence are from a group of artificial intelligence tools called machine learning, where computers use sets of instructions to get better at doing things with information on their own, without stopping. The kind of machine learning that has made a lot of progress in artificial intelligence possible recently, like using artificial intelligence to find faces, is called artificial neural networks. Artificial neural networks are based on how the brain works, with its connections linking brain cells. There are lots of kinds of artificial neural networks, and the tools for creating both text and pictures use some artificial intelligence methods that experts have been able to use for some time. For instance, to work, ChatGPT uses a generative

transformer that was trained before, and creating images with artificial intelligence, known as generative adversarial artificial intelligence, uses some methods that experts have been able to use for several years. ChatGPT uses a generative transformer that was trained beforehand, while making pictures with artificial intelligence, or generative adversarial networks, is also used.

(Guidelines for Using Generative AI in Research and Education, 2024)

2.7. Tips for dealing with generative AI. Receiving information generated by it in the future: Dealing with generative AI requires understanding the rules of interaction and taking advantage of the possibilities it offers. Here are some tips for dealing with the information it produces: (LAMSIYAH)

- Learn the basics of artificial intelligence: Familiarizing yourself with the basics of artificial intelligence and learning about generative systems and how they work can help you interact with them more efficiently.
- Give clear instructions: When requesting information from generative AI, make sure you provide clear and specific instructions to get the desired results.
- Verify the credibility of the information: Generative AI can be useful for obtaining information, but it is necessary to verify the credibility of the sources and ensure the accuracy of the information provided.
- Repeat instructions when necessary: If you do not get the desired results the first time, don't hesitate to rephrase your request or provide more details to improve the results.
- Ethical use: Ensure that you use generative AI responsibly and ethically, respecting the privacy of others and intellectual property rights.
- Stay informed: The field of AI is evolving rapidly, and it is important to stay up to date with the latest developments and improvements in this area..

3. Startups:

3.1. Definition of a startup:

Startups are defined as newly established organizational entities characterized by high flexibility, continuous search for innovative business models, and the ability to adapt to a rapidly changing business environment. However, these enterprises face fundamental challenges, including limited financial resources, a lack of accumulated experience, and high risk levels. Therefore, adopting innovative technological solutions primarily generative artificial intelligence is a strategic option for enhancing their ability to survive and grow.

The term “start-up” originated in the United States in the late 1970s with the emergence of venture capital, became popular in the late 1990s, and gained further attention with the advent of the internet and technology in the early 2000s.

It is used to describe a new company in an innovative phase that is experiencing very high growth due to the technology it uses to achieve growth.

The literal meaning of the term “start-up” is “start-up,” which consists of two separate words: “start,” which means to begin, and “up,” which means growth. When combined, the meaning is that this institution is a small project that has just begun and is starting to grow.

In French, it is known as jeune entreprise novatrice dans le secteur des nouvelles technologies, meaning young innovative companies in the modern technology sector; that is, companies of a technological nature.

Startups are newly established economic entities, usually created with the aim of developing innovative products or services, characterized by high flexibility and a constant search for new business models. They differ from traditional enterprises in their focus on innovation and rapid growth rather than just stability and continuity. (Dorf, 2012)

Eric Ries (2011) defines a startup as "an organization designed to create a new product or service under conditions of extreme uncertainty." (Ries, 2011)

The Algerian legislator defined it in Executive Decree No. 20-254 on the creation of startups, innovative projects, and business incubators, specifying their tasks, composition, and operation, as well as the conditions for granting each label. It also specified the criteria required to qualify as a start-up, which are: (Official, 15/09/2020)

- The start-up company must not be more than 8 years old
- The company must have an innovative idea and business model
- Its turnover must not exceed the quota set by the national committee responsible for granting the start-up label

It must not have more than 250 employees

The company's capital must not be more than 50 percent owned by individuals or investment funds from institutions that have a startup certification.

3.2. Characteristics of startups :

- **Innovation:** Offering new or improved products or services.
- **Flexibility:** Adopting agile methodologies (Agile/Lean Startup) to adapt quickly to the market.
- **High risk:** Higher failure rates compared to traditional institutions.
- **Rapid growth:** Seeking to expand rapidly in local or global markets.
- Reliance on external financing, such as venture capital or accelerators and incubators

3.3. The role of startups in innovation:

Startups play a role in delivering and supporting innovation, as evidenced by several points, some of which are mentioned below: (Ries, 2011)

- **Source of new ideas:** Startups are often built around an innovative idea or a new solution to an existing problem.
- **Rapid experimentation:** They operate according to flexible methodologies that allow them to quickly test ideas and modify them based on market feedback.
- **Value creation:** Innovation is not limited to products, but also includes business models, distribution methods, and customer service approaches.
- **Incubator for innovation:** Developing new solutions to economic and social problems.

- **Job creation:** Supporting employment, especially for young people and those with creative ideas.
- **Revitalizing the digital economy:** Contributing to digitization and economic transformation.
- **Influencing traditional institutions:** Pushing them to embrace innovation to remain competitive.

3.4. The importance of start-ups: (Schwab, 2016)

- Supporting the national economy by contributing to GDP.
- Encouraging initiative and entrepreneurship among young people.
- Accelerating technological transformation through the application of modern technologies such as artificial intelligence and financial technology.
- Attracting foreign investment, especially in technology sectors.
- Enhancing the global competitiveness of countries through strong startups.

4. Organizational readiness :

4.1. Definition of organizational readiness:

Organizational readiness is defined as the level of preparedness of an organization in terms of infrastructure, human capabilities, and regulatory environment to successfully adopt new technologies. It is the readiness (of government institutions, civil institutions, development agencies, local institutions, and academic research institutions) in the areas of (information acquisition, planning and management, financing, material and human resources, and motivation). According to Eitle et al. (2022), readiness is not a static state, but a dynamic process that includes the following stages: awareness, desire, knowledge, and ability. Weiner (2009) believes that it includes two main dimensions: (Al-Janoubi, 2022)

- Psychological and behavioral readiness (human factor and organizational culture)
- Structural and technical readiness (resources, infrastructure, leadership).

Readiness to adopt generative AI requires a balance between technical and human aspects, so that preparation is not limited to acquiring technology, but also includes developing the digital culture and analytical capabilities of employees.

4.2. Institutional readiness to adopt generative AI :

An organization's readiness to adopt generative AI consists of a set of interrelated dimensions:

- **Strategic readiness:** clarity of vision and digital goals, and integration of AI into the organizational transformation plan (Zuo X. , 2025)
- **Technological readiness:** Availability of infrastructure and integrated systems, and degree of compatibility with AI systems (Eitle, 2022)
- **Human readiness:** Employee skills, acceptance of technology, and ability to use AI tools
(Weiner, 2009)
- **Community readiness:** (consumers, contractors, society) in the areas of community participation, environmental awareness, and trends in water management and use, to ensure the success of the institution and society (Medhat, 2013)

- **Organizational readiness:** Organizational readiness is a new concept that refers to the extent to which employees in an organization are prepared to initiate or continue behaviors related to change, which aims to motivate employees in the organization to change. Organizational readiness in an organization is the first indicator of success in bringing about the changes required by the organization. Therefore, it is a crucial and essential factor for the successful implementation of change in an organization. An individual in an organization is ready for change when they understand, believe in, and intend to achieve change. To understand this concept, we can say that organizational readiness refers to the extent to which members of the organization are psychologically and behaviorally prepared to bring about organizational change. It aims to measure readiness by identifying strengths and weaknesses in the organizational structure, which consequently help or hinder the achievement of the desired change. (Al-Janoubi, 2022)
- **Ethical and legal readiness:** Clarity of the regulatory and legal framework for the use of generative artificial intelligence within the organization. (Ettinger, 2025)

4.3. Models for assessing institutional readiness : There are multiple models for assessing readiness to adopt artificial intelligence technologies:

- **Model of readiness to adopt artificial intelligence in the exhibition sector**

This design connects the Technology-Organization-Environment setup and the Technology Readiness Index design, and it shows an "Organizational Readiness Model for AI Adoption" that includes things like money, tech setup, company culture, skills inside the company, and outside forces. The people who wrote this make a general plan for getting ready before using something, and they suggest things to measure, as well as signs (like a questionnaire) that could be used in other areas too. (Hradecky, 2022)

- **Organizational Readiness Framework for Generative AI Adoption**

This work presents a theoretical framework for measuring "organizational readiness for generative AI" across eight dimensions: Resource readiness, IT readiness, cognitive readiness, partnership readiness, innovation value, strategic readiness, cultural readiness, and IT governance readiness, with 26 detailed measurement indicators. This framework can be adapted to measure AI adoption readiness in general, not just. (Zuo, 2025)

- **A systematic review of AI maturity models**

This review presents the AI Maturity Model (AIMM), which aims to assess an organization's AI capabilities and guide its journey toward AI adoption, with maturity levels and dimensions covering strategy, data, technology, and skills. It serves as a theoretical reference for designing readiness or maturity metrics, particularly in healthcare contexts, but is generalizable.

- **Maturity/Readiness Model for Artificial Intelligence in the Public Sector**

This research report (sponsored by the IBM Center for The Business of Government) proposes a “maturity model for artificial intelligence in the public sector” based on six key elements: Big data, AI systems, analytical capability, innovation climate, governance and ethics frameworks, and strategic vision, with maturity levels ranging from “ad hoc” to “comprehensive organizational transformation.” The model is used as a maturity/readiness assessment tool for government agencies at various stages of AI adoption. (Desouza, 2021)

- **Other maturity and readiness models related to responsibility and governance**

The Responsible AI Maturity Model is about how prepared a company is to use responsible AI, looking at things like how it's managed, its ethics, how it handles risks, and how open it is, while also suggesting levels of progress and a plan to get better.
More work on the AI Maturity Model for government helps create a working model to measure AI skills in government offices and make a plan to improve.. (Ferreira, 2025)

5. The importance of generative AI in startups and advertising

Create Startups are an ideal environment for adopting generative artificial intelligence due to their high flexibility and ability to learn quickly. However, they face challenges in financing, a lack of technical expertise, and weak digital infrastructure. Therefore, enhancing institutional readiness means developing their capabilities through:

5.1. **Promoting innovation and creativity** (Dwivedi, 2023)

- Generative AI helps startups innovate new products and services faster and with fewer resources.
- It provides tools for designing prototypes and developing creative solutions to complex problems

5. 2.- Accelerating growth and expansion

- It enables startups to quickly enter markets by producing interactive and marketing content that aligns with customer trends.
- It supports rapid growth strategies (scalability) by automating operational processes

5.3. - Reducing operational costs

- Contributes to reducing costs related to marketing, customer service, or analysis by automating these processes.
- It reduces the need for large work teams, allowing startups to direct resources toward research and development (McAfee, 2017)

5.4. Improved decision-making

- Generative AI can be used for data analysis and forecasting, helping to make accurate strategic decisions in an uncertain business environment.
- Supports startup managers in strategic planning and risk management (Cockburn, 2018)

5.5. Enhancing competitiveness

- Generative AI enables startups to offer customized products and services tailored to customer needs.
- It provides a competitive advantage through continuous innovation and the ability to adapt to technological and market changes (Schwab, 2016)

5.6. Attracting investors and partners

- Startups that adopt generative AI are more attractive to investors because of their association with innovation and rapid growth potential.
- It increases opportunities for collaboration with business incubators, accelerators, and large corporations (OECD, 2010)

Table 1. Dimensions for assessing start-up readiness to adopt generative AI

Dimension	Guiding question for a start-up	Example indicators (1–5 scale)
Strategy & Vision	Is there a clear vision for using generative AI in the business model?	Defined use cases, expected value, roadmap
Data Readiness	Is data available, clean, secure, and accessible for training/using models?	Data quality, governance, integrations
Technology Infrastructure	Can current stack support LLMs, APIs, and needed compute?	Cloud, GPUs/TPUs, APIs, MLOps tools
Talent & Skills	Do people have AI, data, and product skills to build and govern solutions?	Data/ML skills, prompt design, product owners
Governance & Ethics	Are there policies for privacy, security, and responsible AI?	Risk processes, compliance, AI policies
Culture & Change	Is the culture open to experimentation and AI-driven change?	Openness, training, leadership support

Source :https://www.revgenpartners.com/insight-posts/revgens-generative-ai-readiness-framework/

6. Practical applications of generative AI in startups :

6.1. Marketing smart advertising content (text, images, videos) at low cost and high speed. Generate customized marketing campaigns for each customer segment (Kietzmann, 2023)

6.2. Product development

- Rely on generative AI in the design of digital products (apps, websites) or even physical products through 3D modeling.
- Generate new technical solutions that meet the needs of emerging markets

6.4. Customer service

- Use generative chatbots that can interact naturally with customers and solve their problems quickly and effectively. (Dwivedi, 2023)
- Reduce human workload and improve the customer experience.

6.5. Finance and risk management

- Generative AI is used to create financial models to predict revenues and expenses.
- Analyze future risks and develop strategies to deal with them (Cockburn, 2018)

6.6. Human resources

- Support recruitment processes by creating job descriptions, analyzing resumes, and assisting in selecting the most suitable candidates.
- Develop customized training plans for employees.

7. The readiness of startups to adopt generative AI

7.1. Digital adoption indicators

- Most startups rely on technology to deliver their products, but do not necessarily use it in their internal operations (such as human resources management).
- Some founders have a basic awareness of tools such as Chat GPT or ATS (applicant tracking systems), but their application remains limited.

7.2. Opportunities for employing generative AI

Automating recruitment processes (writing job ads, sorting resumes).

- Designing customized training plans.
- Intelligently analyzing performance based on digital targets.

7.3. Barriers to adoption

- Lack of knowledge about generative AI.
- Weak internal digital infrastructure.
- Lack of consultants or specialists in this field.
- Absence of clear government policies or guidelines.

8. Algeria's experience in startup readiness :

In Algeria, the Ministry of Knowledge Economy and Startups works to support the readiness of institutions through initiatives such as:

- Launching digital university incubators. ● Supporting open innovation programs.
- Financing generative artificial intelligence projects through the Startup Fund.

Challenges: Despite efforts to promote the startup sector in Algeria and move towards digital transformation and artificial intelligence, the adoption of these technologies remains limited due to:

- A lack of technical expertise in artificial intelligence.
- The absence of a clear legal framework for generative AI technologies.
- A lack of partnerships between the academic and professional sectors.

4. Conclusion :

The adoption of generative AI by startups is not a luxury option but has become a strategic necessity for sustainable growth and competitiveness in the modern business environment. However, readiness plays a pivotal role: without a thorough assessment of the company's capabilities at the strategic, technical, and managerial levels, this opportunity can become a burden, both in terms of cost and risk. By building a comprehensive readiness framework and adopting strong governance practices, startups can leverage GAI not only to increase productivity or innovation but also to ensure the sustainability of technology within their business model. To achieve this, decision-makers in these organizations, investors, and practitioners should review the proposed steps and focus on responsible and balanced implementation rather than rushing into adoption without a solid foundation.

Recommendations

- Establish an internal GAI leadership team that includes senior management and technical leaders to guide the adoption strategy.
- Assess readiness before implementation by conducting internal surveys to assess the organizational and technical status before embarking on a project.
- Build data infrastructure by investing in data collection, organization, and storage in a way that supports generative models.
- Govern risk by adopting an AI governance framework (including transparency, accountability, and security).
- Train the workforce by organizing courses and workshops to raise employee awareness of how to interact with generative AI and use it effectively.
- Adopt a gradual strategy, starting with simple use cases (pilots) before full expansion.
- Monitor and evaluate performance by setting key performance indicators (KPIs) to measure the impact of GenAI on growth, productivity, and sustainability.
- Partner with external parties and collaborate with technology providers or research institutions to obtain technical and strategic support.

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